Committee of Visitors, April 7-9, 2010
Atmosphere Section
Division of Atmospheric and Geospace Sciences
National Science Foundation

RESPONSES TO COV RECOMMENDATIONS

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We thank the Committee of Visitors for their time and thorough evaluation of the merit review practices and research outcomes in the Atmosphere Section (AS). We are pleased that the Committee found our practices to be generally appropriate and thorough, and the outcomes of AS-supported research to meet the NSF's goals of Discovery, Learning, Research Infrastructure, and Stewardship. However, the Committee also made some recommendations, and we wish to take this opportunity to provide some responses.

> *[A.1.1.]* The Committee commented on the use of panels vs. mail review only in the core programs, and concluded *"The COV is satisfied that the POs exercise appropriate judgment in balancing panels and ad hoc reviews and also appropriately revisit the arguments in favor of panels and ad hoc reviews."*

Indeed, this question continues to be debated in the Section and the optimum solution for each case is sought. Among the advantages of using panels are possible efficiencies in the review, and the possibility of real-time discussion among reviewers of diverse scientific backgrounds and viewpoints. Possible disadvantages are the need to impose deadlines on PIs, limited time available to discuss every proposal, and a range of scientific topics that may be difficult to cover with a panel of limited size. Panels have been used and will be used (on a case-by-case basis) for special programs (e.g., P2C2, CAREER, REU sites) and field programs.

> *[A.1.1.]"Some proposals by-passed peer review and were fast-tracked by the program managers (outside of the normal SGER/EAGER/RAPID process). These were generally small efforts tied to planned field campaigns. This seems like a good way to fund emerging ideas but the COV recommended that it should always be exercised with utmost integrity to avoid being over-used."*

AS Response: We note that other than SGER/EAGER/RAPID, supplements, and conference awards there are in fact no other mechanisms available that allow for the recommending of awards without peer review.

> *[A.1.2.] "**Recommendation:** The COV recommends that AS consider piloting the formation and use of a separate, standing pool of Broader Impacts reviewers with particular expertise in education, outreach, and knowledge transfer, as is done, for*

example, with STC site visit teams, to establish a consistent and high level of broader impacts review across all the AS proposals."

AS Response: We agree with the Committee that selecting separate reviewers for Broader Impacts is advantageous for proposals that have a significant education or outreach component. This was, in fact, done in some Programs during the period reviewed: As an example, in recent years the Atmospheric Chemistry Program (ATC) and the Climate and Large-Scale Dynamics Program (CLD) asked separate ad-hoc reviewers to comment on the educational components and related broader impacts of the CAREER proposals received by the respective programs. As another example, a virtual panel was used in 2008 to review REU site proposals. In FY 2010, as a Division-wide pilot effort, a panel will be convened to review the education components of all CAREER proposals.

On the other hand, in many of the core program proposals the broader impacts focus on student/post doc mentoring and beneficial outcomes to the community, such as improved models, facilities, etc. We believe that the "science reviewers" for each program are qualified to review these broader impacts aspects as well.

[A.1.8] "The POs might consider making additional site visits to see the PI's operations at their home institutions. The COV feels this could add an additional perspective that does not necessarily emerge through the external or panel review process, but the COV recognizes that staffing and resources may not generally permit this."

AS Response: We agree that site visits can be useful and interesting, especially when there is an opportunity for a PO to see instrumentation, facilities, meet students and collaborators, etc., that are critical to carrying out proposed or awarded projects. However, as the Committee noted, the high PO workload prevents us from visiting a significant number of the PIs in the Programs and so we need to carefully prioritize visits over a few years. POs find that the best way to interact with a large number of PIs is to attend professional society meetings (in particular, AGU and AMS), workshops, and field projects. Other possible venues are NSF outreach days and specialized workshops, as well as PI visits to NSF or communication via email or telephone..

[A.3.2.] "NSF is relatively unique among federal science funding institutions in its sustained commitment (at all levels of the organization, including that of individual programs) to supporting and promoting education. Precisely defining the meaning of "integration of research and education," and established a desirable level (scientifically? societal?) is not straightforward.
Education has many aspects, including career development, as well as skill development. It would be helpful to have some statistics about various outcomes, e.g., how well the community of scientists has been doing at placing students in various positions, both academic and other professional positions".

AS Response: This comment is really directed toward the NSF as a whole, and we will forward this suggestion. The NSF Division of Science Resources Statistics (SRS, http://www.nsf.gov/statistics/about.cfm) in fact collects data on many aspects of science funding, including student support and science careers. Their most comprehensive publication is the annually published "Science and Engineering Indicators" (http://www.nsf.gov/statistics/pubseri.cfm?TopID=8&SubID=1&SeriID=2). These data of course are not broken down by NSF Program. In the science divisions, we have neither the resident staffing resources nor the expertise to carry out our own community surveys. On a qualitative level, some of this information can be gleaned from Annual and Final reports which are routinely reviewed by POs. In addition, we benefit from the advice of the Directorate's education team which works with the education community on best practices for learning and evaluation.

[A.3.10.] "Does the program portfolio have an appropriate balance: Across disciplines and sub-disciplines of the activity?

Comments:
This appears to be a priority for AS, where cross-disciplinary and interdisciplinary ideas and proposals are proactively encouraged and appropriately supported. The large number of awards and the amount awarded for projects co-funded with other NSF programs speaks well of the interdisciplinary nature of research conducted in the Section. Most if not all of the major sub-disciplines appear to have at least some representation.

The COV found that the Paleo Program has a broad interdisciplinary portfolio, both within Paleo and also extending to other Divisions, but there was not as much cross-disciplinary activity between Paleo and the other programs in AS. Some formal strategic planning process, as discussed in A.4 below, might help identify reasons for this and opportunities for additional collaboration."

AS Response: As the Committee notes, the Paleoclimate Program is inherently interdisciplinary and, via the P2C2 competition, collaborates closely with the Divisions of Earth and Ocean Sciences (EAR, OCE) and the Office of Polar Programs (OPP).

Regarding collaborations within the Section, it should be noted that informal agreements are occasionally made instead of formal co-funding to simplify the paperwork. For example, PCP funded a workshop that addressed mostly CLD and Paleo-related research ("Predicting the Climate of the Coming Decades"). PCP and CLD have several researchers in common.

In general, we co-review and co-fund projects as appropriate and as necessary to accommodate the research community.

[A.3.11.] "The POs are appropriately concerned about diversity in their awards. The proportion of female (roughly 10-15%) and minority (roughly 2-5%) PIs in AS is low. However, this reflects the present situation in earth and atmospheric

sciences as a whole, a problem that goes far beyond AS. We are satisfied that AS takes seriously the issue of broadening participation. The COV is satisfied that the Section is firmly committed to diversity and engagement of underrepresented groups and that the POs are doing their best to attract minorities in all areas. However, NSF could take additional steps to support the POs in their efforts to do so.
***Recommendation:** The COV recommends that NSF investigate ways to offer additional institutional support for developing pools of reviewers and potential PIs from currently underrepresented groups and for building relationships with these individuals."*

AS Response: This recommendation appears to be aimed at NSF as a whole, and we will forward this suggestion to appropriate levels of management. In the meantime, the Division and Section continue to explore outreach venues to attract more members of underrepresented groups as PIs and reviewers, such as NSF outreach days, professional meetings, organized visits to NSF, etc. We are also exploring ways to develop databases of members of underrepresented groups, however, we have to carefully evaluate legal issues. As the Committee pointed out, the fraction of reviewers who supply their demographic information is frustratingly low.

[A.3.12.] "AS research features prominently in the products of the IPCC, USGCRP (formerly CCSP), and the National Academies. AS is intrinsically linked to national priorities in weather, climate, and air quality. As the goals and objectives of the Paleo Program (including P2C2), CLD, and ATC are explicitly tied to the USGCRP, as well as to NSF's Geovision report, and the 2006-2011 Strategic Plan, these programs are indeed relevant to national priorities and the NSF's mission. Certainly, the types of studies conducted within the PDM program are needed to estimate the affect of climate change on local-to meso-scale weather phenomena, and to assess effects of these phenomena on issues of national interest such as commerce, transportation and agriculture.

The Section should be a 'Flagship' for NSF's contributions to the USGCRP. But other than the P2C2 endeavor we saw little evidence that the Section has a well-delineated implementation plan to contribute to the USGCRP via perhaps CCSP goals. When asked of the program officers how the section is contributing to this national effort. The philosophy seems to be that it is up to the community to submit proposals that would contribute to the USGCRP. There is a need for a strategic vision and planning. The COV recommends that the Section itself be more proactive in reaching out to the community in this regard".

AS Response: Indeed, all Programs in AS are closely linked to the national and international priorities, and we will present these linkages better in the overview presentation to the next COV. Specific interagency examples of projects are the Climate Process and Modeling Teams, the IPCC analysis grants supported by CLD, various field campaigns co-sponsored by PDM and CLD with their interagency partners at USGCRP and NAS activities. Currently there is no written implementation plan for how AS contributes to the USGCRP. It should be noted, however, that the USGCRP itself is in the process of developing a new strategic plan. AS program managers will be providing input

to the development of the new USGCRP strategic plan, as appropriate. When that plan becomes available, we will revisit how our efforts map to those.

However, we note that not all research supported by AS directly maps to USGCRP plans. NSF has a unique role in that it accepts and funds proposals that are not explicitly linked to externally developed programs. We consider it important to retain that flexibility and to keep the door open for unforeseen advances, and continue to balance research in other areas with that directly linked to UGCRP. Of course these distinctions are often not easily made.

We agree with the Committee on the value of formal strategic planning, and indeed the Division will commence a major strategic planning effort shortly. We also agree that outreach to the community is a very good idea. We intend to intensify our efforts in particular at professional meetings and NSF outreach events at professional meetings.

> *[A.4.1] "As with the previous COV, there was concern with the gap in staffing during periods of transition of rotating staff. In addition, while the COV fully recognizes the benefit of IPAs bringing fresh ideas and an evolving sense of the community into each program, this must be balanced against the continuity, institutional memory, and accrued experience that can only be achieved with full-time NSF POs.*
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> ***Recommendation:** The COV recommends that each program establish a policy of having at least one full-time PO and one IPA at all times, to achieve this balance and ease transitions"*

AS Response: We agree with the Committee that pairing rotators with POs who are permanent employees is a very good idea, and this is, in general, the goal. However, due to a variety of circumstances, staffing transitions occur and seamless replacement is not always possible. Currently, ATC has two rotators; CLD two permanent POs, one rotator, and two experts; PCP one permanent PO, and PDM one permanent PO and one rotator. (Rotators can be but don't have to be IPAs.)

> *[A.4.3.] "As noted by the previous COV, as well as in the NRC report, "Strategic Guidance for the National Science Foundation's Support of the Atmospheric Sciences" (2007, page 66), this COV notes that the Paleo budget is conspicuously low when compared to the budgets of the other programs. In an environment of essentially constant percentage increases, such as was the case in FY07-09, this disparity will only continue to grow.*
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> ***Recommendation:** The COV is not in a position to comment on the appropriateness of the size of the budgets within the AS programs. However, the COV recommends that AS establish a formal strategic planning process to transparently establish and justify the basis for the future budget trajectories of each of the programs within the Section.*
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> *As discussed in #1 above, the AS programs are extremely well managed, and the POs are entrepreneurial in seeking opportunities for collaboration both within, and outside of, the Section (e.g., the success of the Paleo PO in convincing POs in other parts of Geosciences to pool funds and create an integrative program,*

P2C2). However, discussions during the COV review made clear that there is no formal process for joint strategic planning across the four programs. The COV feels that such a process would be helpful in a number of ways: e.g., to establish and justify budget trajectories (as noted above), to identify additional opportunities for collaboration across the programs (e.g., between Paleo and CLD in the area of multi-decadal dynamical variability in the atmosphere and ocean), and to link up even better with evolving top-down priorities (e.g., NSF-wide, national)."

***Recommendation:** The COV recommends that AS establish a formal strategic planning process across the four programs in the Section and the Section leadership. This process would explicitly address issues including future budget trajectories of the program, inter-program collaboration, mapping the Section scientific priorities onto higher-level strategic plans at NSF and the U.S. government as a whole, identifying and seizing emerging opportunities, and articulation of a shared "Section identity." This process would be aided by a number of mechanisms, including meetings, retreats, and a written strategic plan."*

AS Response: As stated above, we agree with the recommendation of the COV for a formal strategic planning process and intend to develop and implement one shortly.

[A.4.3.] This COV concurs with the recommendation of the previous COV that additional, quantitative metrics and measures of success of AS outcomes may be very valuable in aiding planning and prioritization, despite the difficulty in establishing them.

***Recommendation:** The COV recommends that AS establish and track additional, quantitative outcome metrics for Discovery, Learning, and Research Infrastructure and use this tracking information to aid in planning and prioritization. Such metrics might include outcomes such as papers published, the numbers of undergraduates, master and graduate students and Post Docs funded through grants, student tracking (graduation of students on projects and their subsequent job histories), availability of gathered data sets, basis for subsequent proposal activity, number of proposals that explicitly target NSF's USGCRP objectives, number of conference presentations, number of patents, etc.*

AS Response: As discussed above, the decision of what data to collect and what metrics to apply, is made at the NSF level. Data collection is subject to some legal constraints, but efforts are underway to acquire and disseminate more information about program outputs and impacts. Also, staffing resources and expertise are insufficient for major additional data collection efforts within the Division or Section. If additional staffing is available in the future (e.g. a summer intern), some of this could be attempted.

[A.4.4.] "Comments: The COV finds a lack of response to the disparity in program funding allocations and the way in which this disparity is being considered by the Section. This was brought up previously by past COVs."

AS Response: We attempted to answer this question. The following considerations are relevant:

- There is no *a priori* reason why different programs should have similar budgets. The reason why CLD, ATC, and PDM are roughly of equal size is coincidental and due to the fact that both CLD and PDM resulted from mergers (in 2004) of two separate programs each, all of which had very different budget levels.
- Paleoclimate research is not only funded by AGS, but also by OCE, EAR, and OPP. Their combined contribution to the P2C2 program is approximately $7M/year.
- In terms of the process for setting Section priorities, we agree with the Committee's suggestion to engage in formal strategic planning, as discussed above.

[C.5.] Recommendations

Inform the COV members about the computer software system (ejackets) that will be provided, and let members know that they can use their own personal computers in lieu of the ones provided by NSF. The software system became very slow, and nearly inoperable in the second half of the first day.

AS response: We regret the slowness of eJacket. However, this would unlikely be any different on personal computers. The complete system shutdown for about an hour on the day of the COV was a very unusual occurrence.

• Improvements to the computer and software system were also identified as a weak spot in the last COV and it is clear that there's been an improvement since then.

• Give COV members access to the ejackets BEFORE they arrive, on site, so that we have more time to review the portfolios, and THEN can spend more time, on site, talking with Program Officers, and each other, before filling out the review template.

AS response: We could offer the next COV the opportunity to have access to the material ahead of time, if GEO and/or NSF policies permit this. This of course could add to their burden and time commitment.

• Add a Section description to the COV review packet, analogous to the Program description provided to the COV at the start of the review.

• Add a presentation on the major findings of the last review and subsequently what changes were made as a result, including explanations of recommendations that were not taken.

Some of this was included, but more information would be an improvement.

AS response: This could certainly be done.

[C.5]

• *Include statistics about how well the community of scientists has been doing at placing students in various positions, both academic and other professional positions.*

AS response: Please see response to item [A.3.2.] above.